

# International Space Station Configuration Analysis & Integration

WE16 Lightning Talk



**Rebekah Anchondo**  
Lead Engineer, Booz Allen Hamilton



B.S. in Aerospace Engineering, University of Texas at Austin  
M.S. in Systems Engineering, University of Houston at Clear Lake

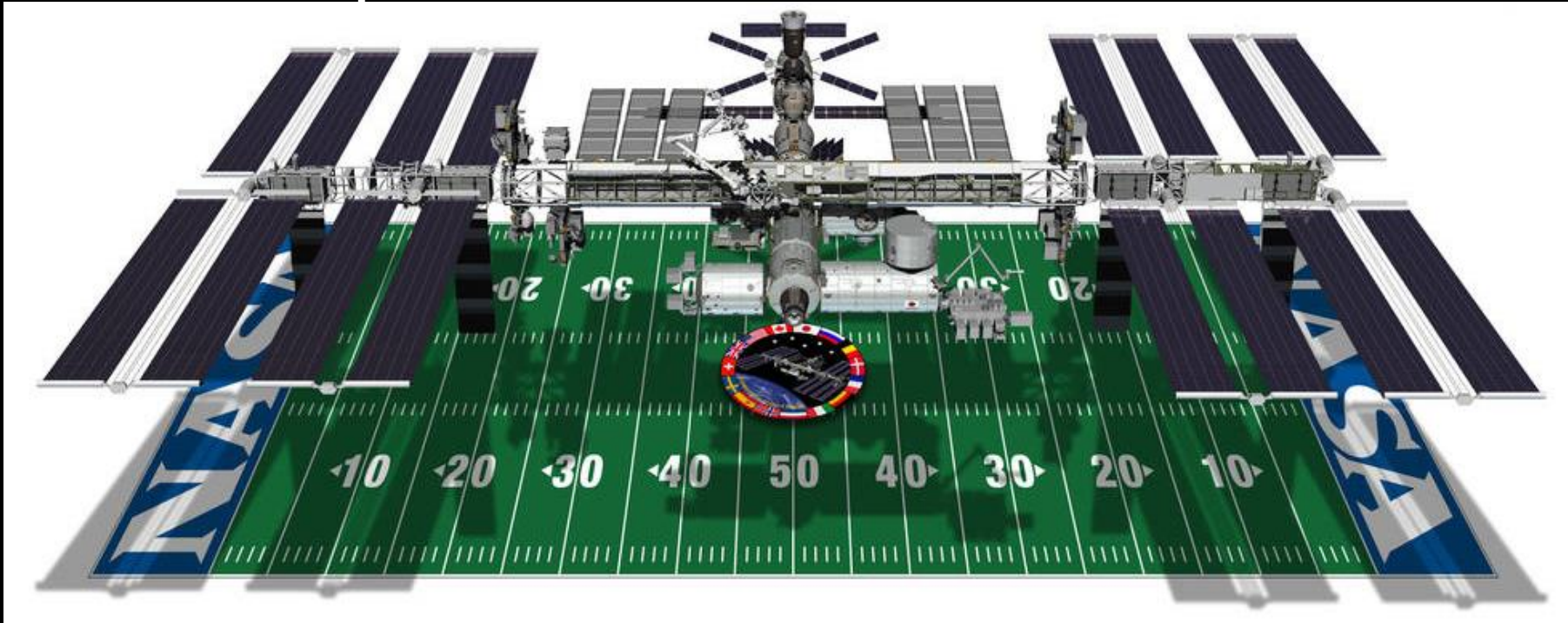
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- Modeling, Analysis, Visualization, Robotics, and Integration Center (MAVRIC) Team
- NASA's International Space Station (ISS) Program Office
- ISS Internal Volume Configuration Lead



With the first ISS element launched in 1998 and assembly completion in 2011, ISS can support a permanent 6 person astronaut crew, and is used to test technologies needed for tomorrow's exploration.

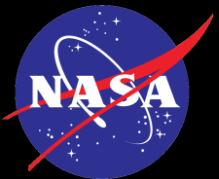


Mass ~920,000 lbs

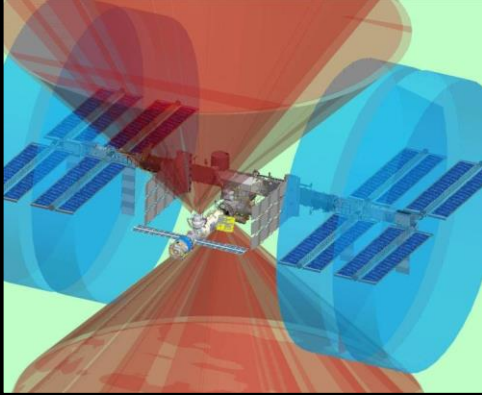
Habitable  
Volume 13,693 ft<sup>3</sup>

Max Speed 17,150 mph  
(orbits Earth every 1.5 hours)

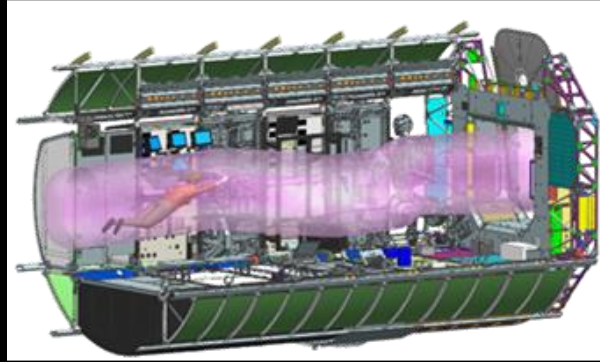
Orbital  
Height 268 miles



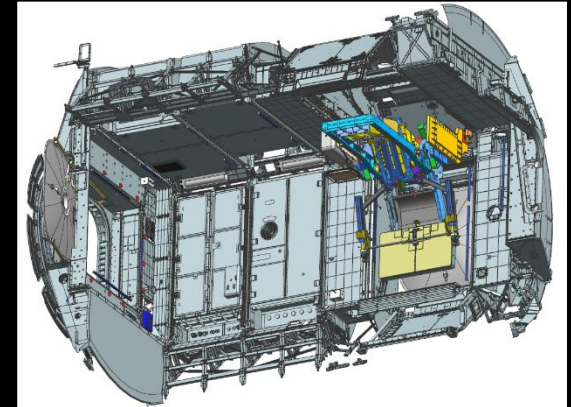
# What Booz Allen Does:



**External  
Configuration**



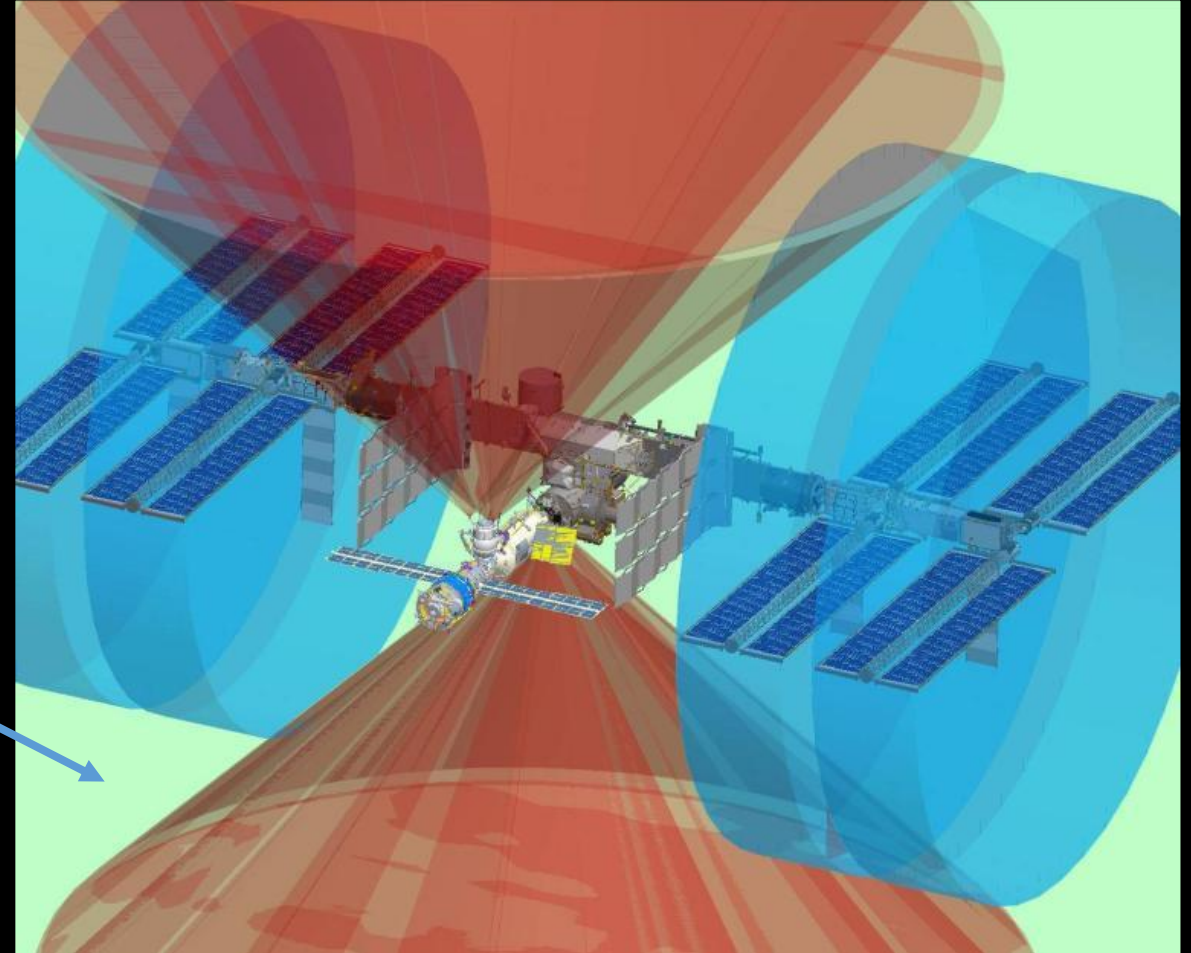
**Internal  
Configuration**



**Trade Studies**

Booz Allen tracks and analyzes past, present, and future **external configurations** to perform static, dynamic, and kinematic analysis and to calculate aerodynamic and mass properties.

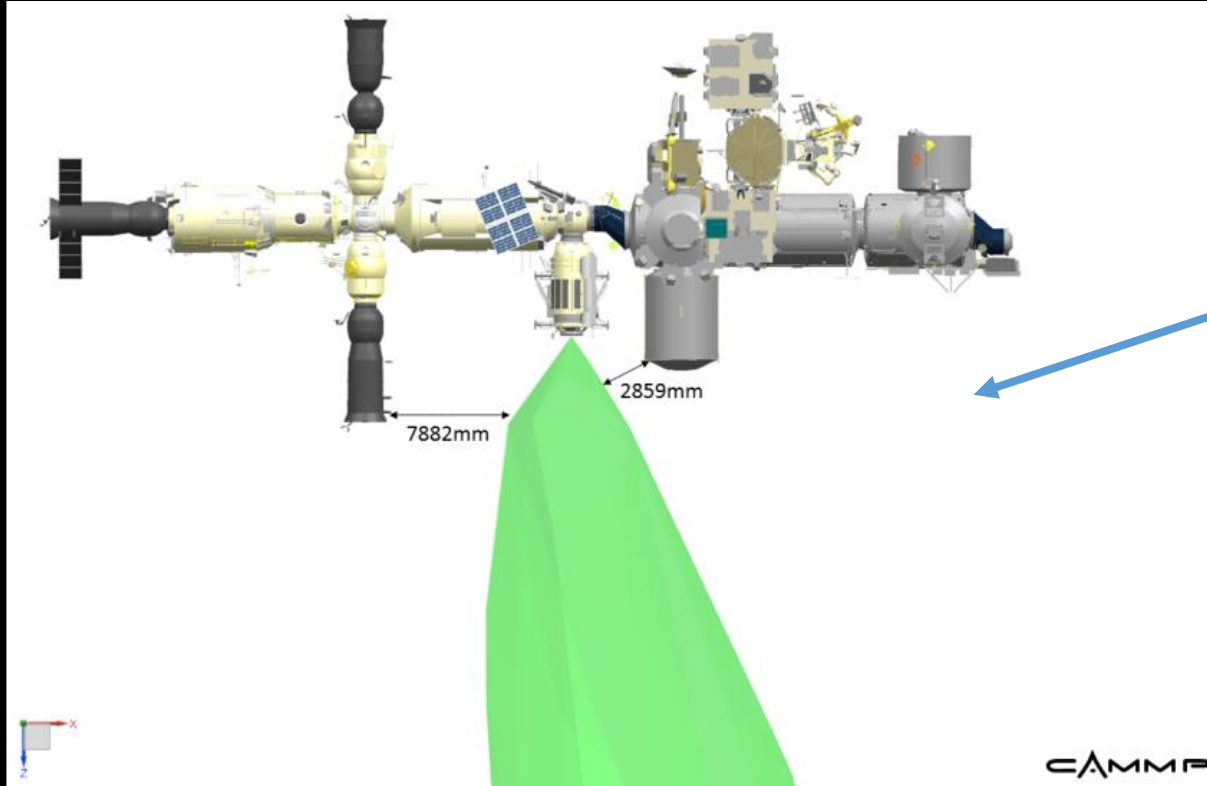
Clearance Envelopes, Keep Out Zones, Field of View, and Motion Envelopes



Performing clearance analysis with DC1 and FGB  
Kurs with Solar Array Static Envelopes

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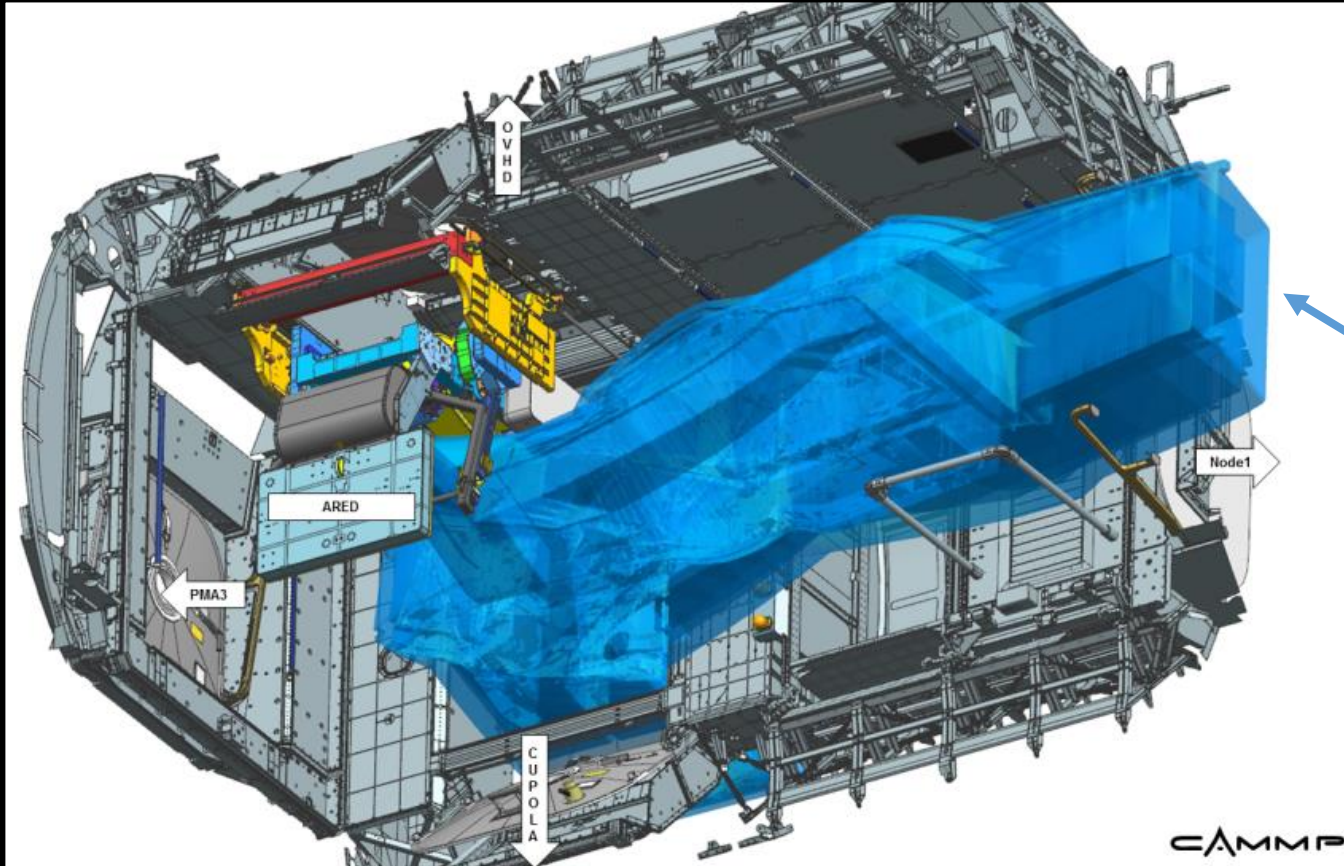


Visiting vehicle approach, capture, separation, and departure corridor envelope creation and clearance analysis

MRM1 Departure Corridor



Booz Allen assesses **internal configurations** of ISS against safety and habitability volumetric requirements such as visibility, lighting, translation paths, and environmental control.



Translation path calculation and optimization for astronauts and large hardware through ISS

Rack Translation though Node 3

**Booz Allen performs multidisciplinary **trade studies** of ISS configurations by working with stakeholders to make sure their needs are correctly matched against evaluation criteria.**

**Trade Studies Include:**

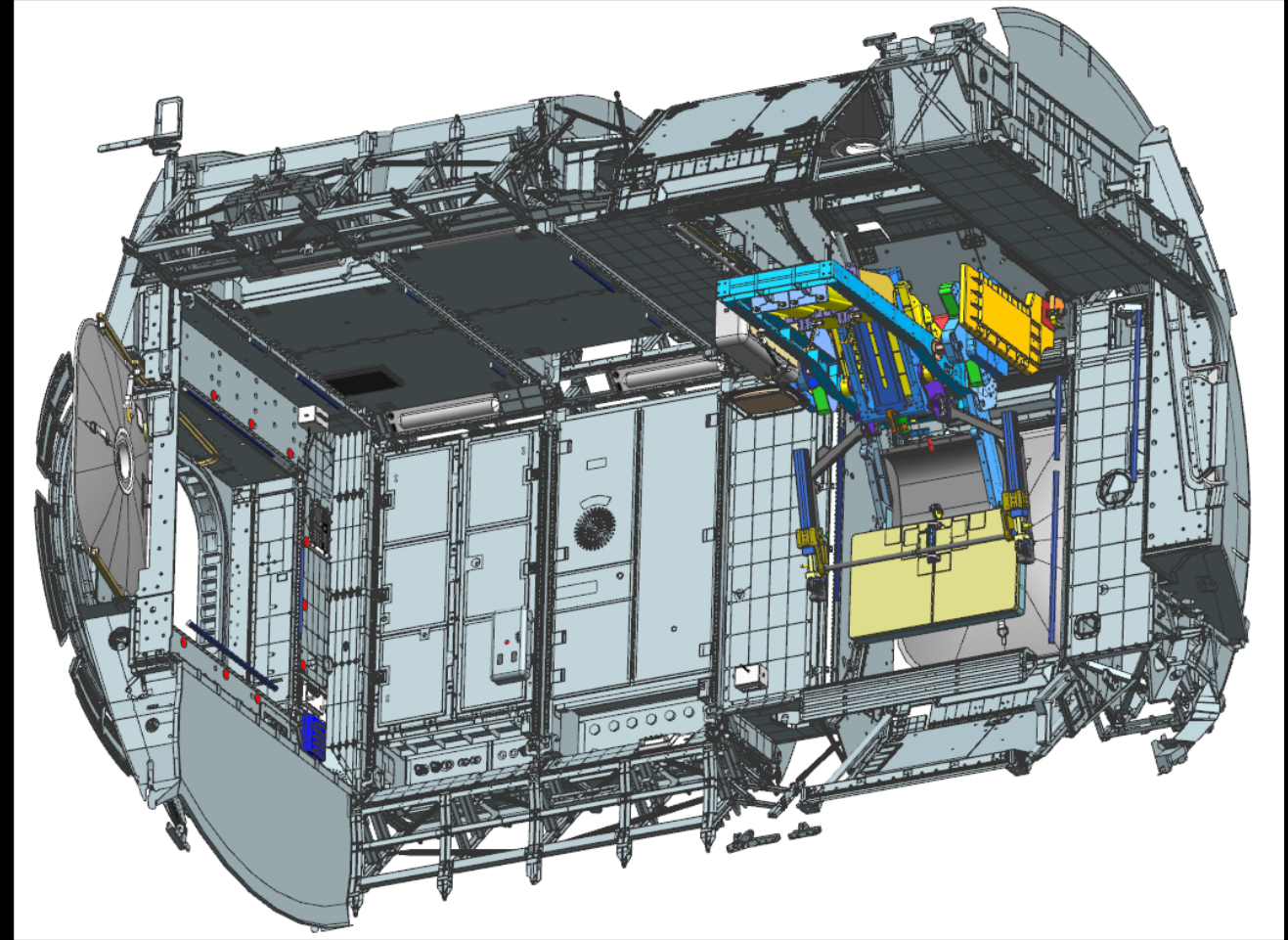
- Docking and Berthing Port Study
- Rack Topology Study
- Sleep Station Location Study

**Stakeholders Include:**

- Astronauts
- Hardware Owners
- Program Management
- Operation teams

**Evaluation Criteria:**

- Safety
- Cost
- Habitability
- Design Feasibility
- Operational Impacts
- Science Impacts



Advanced Resistive Exercise Device Location Study  
within Node 3



We do it all with...



Software for Space, Defense & Intelligence

# Thank you!



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swe<sup>TM</sup>

